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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,023	12/08/2005	Sun-Uk Kim	12568-003US1 OPP 053249 U	1005
69713 7590 02/26/2009 OCCHIUTI ROHLICEK & TSAO, LLP 10 FAWCETT STREET CAMBRIDGE, MA 02138				
EXAMINER SNELTING, ERIN LYNN				
ART UNIT		PAPER NUMBER		
1791				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INFO@ORTPATENT.COM

Office Action Summary

Application No.

10/560,023

Applicant(s)

KIM ET AL.

Examiner

Erin Snelting

Art Unit

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-845)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 01-18-2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1, line 3 reads "up to 1050 or 1200°C", and it is unclear if the temperature is raised to exactly 1050°C or 1200°C, or if the range is also inclusive of temperatures between 1050°C and 1200°C.

Claim Objections

3. Claim 9 is objected to because of the following informalities: element "it" is used in lines 25, 26, 28, and 29. For example, while one may deduce that "it" in line 25 is referring to the silica gel of line 24, one may also interpret "it" to refer to the tube furnace of line 24. Examiner suggests replacing "it" in claim 9 as follows:

"The method of claim 6, which comprises
putting the silica gel into a first tube furnace;
subjecting said silica gel to a first heat-treatment...and then maintaining the temperature for 10 to 20 minutes; and
subjecting said silica gel to a second heat-treatment...then maintaining the temperature for 20 to 60 minutes."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Kang '427 (KR 0121427 B1, see attached English language translation).
6. Regarding claim 1, Kang '427 teaches heat treating a silica gel by increasing its temperature at a speed of less than 90°C per minute up to 1050 or 1200°C and maintaining the temperature for a predetermined time ("after putting in the silica (sic) gel into the alumina crucible and per hour heating with the speed of 120°C in air to 1100°C, maintaining and thermally processing at high temperature, the embodiment 1 cools to the room temperature", translation page 4). Examiner notes that the claimed temperatures of "1050 or 1200°C" are interpreted to include temperatures between 1050 and 1200°C, and that 120° per hour equals 2°C per minute, which is less than 90°C per minute.
7. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Iler '172 (US Patent No. 3,855,172).
8. Regarding claim 6, Iler '172 teaches a heat treatment process, wherein silica gel is subjected to a first heat-treatment at 400 to 900°C, and is subjected to a second heat-treatment at 1050 to 1200°C (Example 1, column 9, line 38-column 10, line 35; first heat-treatment: "heated in an air oven at 550°C", column 10, lines 12-13; second heat-

treatment: "product was then heated to 1,050 °C", column 10, line 33; note that same temperatures are also used in subsequent examples).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kang '427 (KR 0121427 B1, translation) in view of Iler '426 (US Patent No. 4,105,426).

12. Regarding claim 2, Kang '427 teaches silica gel but does not teach the silica gel has pores with a size of about 20 to 70 angstroms, and a pore volume of around 0.3 to 1.1 ml/g. In analogous art of silica gels, Iler '426 teaches silica gel having pores with a size of about 20 to 70 angstroms and a pore volume of around 0.3 to 1.1 ml/g (see column 10, Table 1, No. 1: Average Pore Size (A) 60, Porosity (cc/g) 0.389) for the benefit of utilizing spheres of specific characteristics in finely calibrated processes such as liquid chromatography. Further, the pore size and pore volume are result effective

variables, and it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such pore sizes and pore volumes for the benefit of utilizing spheres of specific characteristics in finely calibrated processes or in applications requiring controlled physical and chemical properties.

Please see *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

13. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang '427 (KR 0121427 B1, translation).

14. Regarding claims 3 and 4, Kang '427 teaches heat-treatment is performed at an average temperature elevating speed ranging from 60°C to 120°C per hour (equivalent to 1° to 2°C per minute, translation page 4). Kang '427 does not teach heat-treatment is performed at an average temperature elevating speed ranging from 5°C to 90° or 10°C or 70°C. However, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to elevate the temperature during heat-treatment at such a low rate for the benefit of preserving the delicate structure of the gel while the gel approaches sintering temperatures. Please see *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235.

15. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kang '427 (KR 0121427 B1, translation) in view of Duraiswami '873 (US Patent No. 6,616,873 B1).

16. Regarding claim 5, Kang '427 teaches heat-treatment as described for claim 1 above. Kang '427 does not teach heat treatment is performed in a rotary tube furnace. In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches heat treatment is performed in a rotary tube furnace (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of increasing porosity by providing even heating to all particles and preventing agglomeration. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of Kang '427 with the rotary tube furnace of Duraiswami '873 for the benefit of increasing porosity by providing even heating to all particles and preventing agglomeration.

17. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iler '172 (US Patent No. 3,855,172).

18. Regarding claim 7, Iler '172 teaches first heat treatment and second heat treatment as described for claim 6 above. Iler '172 does not teach the first heat treatment is performed for 20 to 60 minutes, and the second heat treatment is performed for 20 to 60 minutes. However, these times are result effective variables. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such heat treatment times for the benefit of allowing adequate time for the desired pore formation and for complete sintering. Please see *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

19. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iler '172 (US Patent No. 3,855,172) in view of Duraiswami '873 (US Patent No. 6,616,873 B1).

20. Regarding claim 8, Iler '172 teaches heat treatment as described for claim 6 above. Iler '172 does not teach heat treatment is performed using at least two rotary tube furnaces. In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches heat treatment is performed using a rotary tube furnace (column 4, line 66- column 5, line 1; column 8, lines 30-63) for the benefit of increasing porosity by providing even heating to all particles and preventing agglomeration. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the heat treatment of Iler '172 with the rotary tube furnace of Duraiswami '873 for the benefit of increasing porosity by providing even heating to all particles and preventing agglomeration. Duraiswami '873 does not teach using at least two rotary furnaces, but it has been held that a mere duplication of parts has no patentable significance unless a new and unexpected result is produced. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize at least two rotary furnaces for the benefit of optimizing the length of heat treatment, temperatures of heat treatment, and manufacturing throughput. Please see *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

21. Regarding claim 9, Iler '172 teaches silica gel, first heat-treatment, and second heat-treatment as described for claim 6 above. For the first heat-treatment, Iler '172 further teaches a heat-treatment temperature up to 700°C (550°C, column 10, line 13 - Note that 550°C is included in the claimed "up to 700°C") and raising the temperature slowly (column 10, line 13). Iler '172 does not specifically that the temperature is increased at an average speed of 35 to 70°C per minute or that it is maintained for 10 to

20 minutes. Further, for the second heat-treatment, Iler '172 teaches the second heat treatment occurs at 1050°C and is maintained for 2.5 hours (column 10, line 33), but not specifically that the heat-treatment is at a temperature of 1100 to 1150°C and maintained for 20 to 60 minutes. However the claimed ramp rates, heat-treatment temperatures, and dwell times are result effective variables. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such ramp rates, heat-treatment temperatures, and dwell times for the benefit of producing adequate porosity, preserving the delicate structure of the pores, and fully sintering the end product. Please see *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Iler '172 does not teach utilizing a first tube furnace and a second tube furnace for heat-treatment of the silica gel. In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches heat treatment is performed using a tube furnace (column 4, line 66-column 5, line 1; column 8, lines 30-63 – note that a rotary kiln is a type of tube furnace) for the benefit of increasing porosity by providing even heating to all particles and maintaining controlled temperature profiles. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the heat treatment of Iler '172 with the tube furnace of Duraiswami '873 for the benefit of increasing porosity by providing even heating to all particles and maintaining controlled temperature profiles. Duraiswami '873 does not explicitly teach using a first tube furnace and a second tube furnace, but it has been held that a mere duplication of parts has no patentable significance unless a new and unexpected result is produced. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a first tube

furnace and a second tube furnace for the benefit of optimizing manufacturing throughput. Please see *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin Snelting whose telephone number is (571)272-7169. The examiner can normally be reached on Monday to Friday 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571)272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven P. Griffin/
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